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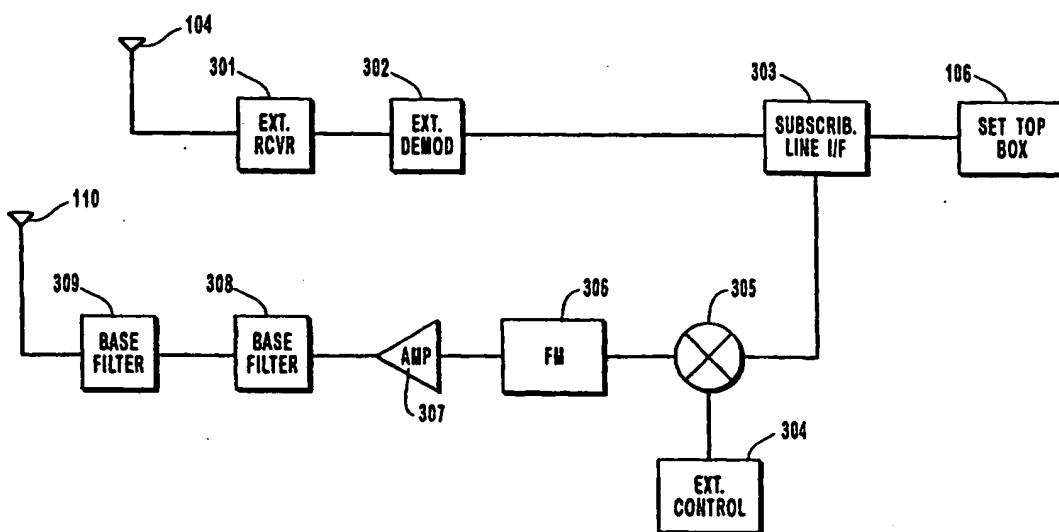
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(54) Title: WIRELESS DATA JACK FOR SET TOP BOXES



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(57) Abstract: A wireless data jack communication system for connecting set top boxes (106) to a central office (101) is provided. Designed to provide an alternative to a telephone connection between a set top box, as used for television and movie viewing, and a central office (101), which provides control, select and billing. This invention provides wireless communications using an RF data link (108 and 111), which in its preferred embodiment includes two communication channels operating around 900 MHz. Alternatively, the two communication channels may operate on or around 49 MHz. This invention is also adapted specifically to have the extension unit (105) integrated within the set top box.

WIRELESS DATA JACK FOR SET TOP BOXES**SPECIFICATION**

5 To all whom it may concern:

Be it known that Scott R. Bullock, David W. Thorson, and Jared Lemke citizens of the United States of America, have invented a new and useful invention entitled WIRELESS DATA JACK FOR SET TOP BOXES of which the following comprises a complete specification.

WIRELESS DATA JACK FOR SET TOP BOXES

Background of the Invention

Field of the Invention. This invention relates to methods and systems for connecting 5 television/movie set top boxes to a central office. More specifically, this invention relates to communication links between a set top box and a central office using a RF data link.

Description of Related Art. Typical set top boxes communicate with the central office for billing purposes using a telephone line connection. However, often there 10 either is no telephone line in close proximity to the television set or the availability of telephone lines are limited. In such cases, the ability to communicate between set top boxes and the central office is greatly limited. For general background material, the reader is directed to the following U.S. Patents, each of which is hereby incorporated by reference in its entirety for the material contained therein.

15 U.S. Patent No. 5,477,263 describes a method and apparatus for rapid channel selection in a video distribution system.

U.S. Patent No. 5,512,934 describes a method and system for providing programming on demand service to television subscribers.

20 U.S. Patent No. 5,559,808 describes a simulcast digital video transmission at separate located sites, that broadcast the same multi-channel, multi-program digital video signal, within a desired service area.

U.S. Patent No. 5,566,232 describes an apparatus that records and accesses information received over a phone network.

U.S. Patent No. 5,585,850 describes a technique for transmitting wideband signals such as video signals over a communication system such as cellular or Personal Communication System, which only has narrowband channels.

U.S. Patent No. 5,592,470 describes a wireless broadband communication system architecture that is structured to provide an array of narrowband and broadband services to an end user on demand.

U.S. Patent No. 5,606,359 describes a video server for providing Video-On-Demand, wherein a plurality of data sources are coupled individually to a first and second bi-directional data/instruction switch.

U.S. Patent No. 5,636,211 describes a universal multimedia access apparatus for accessing any of a plurality of multimedia applications that are provided by a multimedia network.

U.S. Patent No. 5,640,453 describes a universal interactive control system for the downloading and playback of information and entertainment services from one or more network distribution centers.

U.S. Patent No. 5,659,353 describes a television distribution system and method that within a desired service area, multiple transmitters at separately located sites simultaneously broadcast the same multi-channel, multi-program signal.

U.S. Patent Nos. 5,699,105 and 5,701,152 describe curbside circuitry for interactive communication services.

U.S. Patent Nos. 5,727,052 and 5,727,053 describe a system and apparatus for recording and displaying information received from a premises such as ambient temperature or information received over a telephone network.

U.S. Patent No. 5,729,549 describes a public wireless packet data network for simulcasting digital video programs for broadcast and interactive services.

U.S. Patent No. 5,729,825 describes a cellular system for distributing a plurality of television programs in a desired service area.

5 U.S. Patent No. 5,742,680 describes a system and corresponding method for selecting one of a plurality of simultaneously received encrypted direct broadcast satellite signals for decryption and viewing.

10 U.S. Patent Nos. 5,742,840, 5,794,060, 5,794,061 and 5,809,321 describe a general purpose, programmable media processor for processing and transmitting a media data stream of audio, video, radio, graphics, encryption, authentication, and networking information in real-time.

U.S. Patent No. 5,752,160 describes an interactive entertainment network system that supplies previews in an analog format while operating in a video-on-demand mode.

15 U.S. Patent No. 5,784,683 describes a broadcast system that supplies multiplexed channels to a plurality of receiving systems.

U.S. Patent No. 5,793,413 describes a system and method for providing interactive multimedia services to subscriber premises utilizing wireless distribution within the subscriber premise.

20 U.S. Patent No. 5,805,806 describes a local area network that supports both baseband digital LAN signals and video, including television signals originating outside the network and local video generated within the network.

U.S. Patent No. 5,815,146 describes a video server for providing Video-on-Demand, wherein a plurality of data sources are coupled individually to a first and second bi-directional data/instruction switch.

U.S. Patent No. 5,822,324 describes a data communication through wireless 5 telephone network that is combined with a broadband digital transmission through a broadcast network.

U.S. Patent No. 5,828,666 describes an environment for providing flexible and adaptable multiservice access to networks of telephony, CATV and wireless traffic.

U.S. Patent No. 5,835,128 describes a system for redistributing a television 10 signal to a multiplicity of receiver units within a multiple dwelling unit.

U.S. Patent No. 5,847,771 describes a digital entertainment terminal that provides multiple digital pictures simultaneously, to provide Picture-in-Picture and Picture-on-Picture capabilities for a conventional television.

U.S. Patent No. 5,852,437 describes a two-way wireless local transmission 15 system that integrates computer and television user interfaces.

U.S. Patent No. 5,852,612 describes an arrangement for obtaining a single copy of a received signal from a simulcast broadcast area.

U.S. Patent No. 5,857,023 describes a method for redeeming for a seller 20 electronic payments generated by and received from a customer using a master key unknown to the seller.

U.S. Patent No. 5,857,142 describes an architecture for providing interactive broadband products and services using existing cable and telephone plant.

U.S. Patent No. 5,864,757 describes an apparatus and method for locking and unlocking mobile telecommunications handsets or other devices.

U.S. Patent No. 5,870,134 describes a two-way CATV network having a radio return path.

5 U.S. Patent No. 5,884,148 describes a system and method for setting up a telephone call over a communication path having at least one wireless communication link that comprises a universal radio converter connected to a standard non-wireless device by way of a standard analog interface over which DTMF tone signals are transmitted.

10 U.S. Patent No. 5,889,506 describes a video user's environment where the user communicates through a digitizing writing surface with the audio/video control apparatus.

15 U.S. Patent No. 5,907,322 describes a system for bookmarking viewer selected TV broadcast events and displaying a set of associated internet locations or website hotlinks, comprising the selection of a set of broadcast events using a remote control, and storing a set of event-identifier data associated with the set of selected broadcast events in an activity table.

20 U.S. Patent No. 5,912,664 describes an apparatus and method for presenting a viewer with an overall representation of the present number of entertainment programs available for selection given one week of program schedule data.

U.S. Patent No. 5,914,941 describes a digital replacement for an analog audio tape recorder that can play back audio programming.

U.S. Patent No. 5,915,094 describes a method and apparatus for delivering multimedia video data from a server to a plurality of clients connected to a communications network.

U.S. Patent No. 5,933,498 describes a method and device that is provided for
5 controlling access to data and distribution of digital property.

U.S. Patent No. 5,936,660 describes a digital video conversion system housing multiple converter chains of units in a single main box chassis.

Summary of the Invention

It is desirable to provide a wireless communication means for connecting set-
10 top boxes to the central office. More particularly, it is desirable to provide a communication link between set-top boxes and the central office for control and billing purposes where phone line access is either limited or unavailable.

Therefore, it is the general object of this invention to provide a wireless communications link between a set-top box, used in association with television
15 entertainment viewing, and a central office, where control and billing information is managed.

It is a further object of this invention to provide a wireless communication link between a set-top box and a central office, which uses either a 900 MHz or a 49 MHz
band RF channel.
20 office.

A still further object of this invention is to provide a wireless communication link between a set-top box and a central office, which includes an extension unit in the set-top box.

These and other objects of this invention are achieved by the system described herein and will be readily apparent to those of ordinary skill in the art upon a review of the following drawings, detailed description and claims.

Brief Description of the Drawings

5 Figure 1 shows the block diagram of the preferred embodiment of the set top box wireless data conversion system of this invention.

Figure 2 shows the detailed block diagram of the preferred embodiment of the base unit.

10 Figure 3 shows the detailed block diagram of the preferred embodiment of the extension unit.

Detailed Description of the Preferred Embodiment

This invention is a communication system and jack for connecting set top boxes to the central office that avoids the requirement for a dedicated telephone connection between the set top box and the central office. The preferred system of 15 this invention provides a wireless data link that uses an RF channel in the 900 MHz band, alternatively this invention may operate in the 49 MHz band.

Figure 1 shows the block diagram of the preferred system of this invention. A base unit 102, is electrically connected to the Central Office 101, to provide a communication interface with the Central Office 101. Information received from the 20 Central Office 101 is frequency modulated by the base unit 102 on the carrier frequency of 925-928 MHz. The base unit 102 is electrically connected to a base transmitting antenna 103 and a base receiving antenna 109. A first RF communication channel 108 is provided between the base transmitting antenna 103

and an extension receiving antenna 104. The extension receive antenna 104 is electrically connected to the extension unit 105, which is preferably electrically connected to and installed within an otherwise standard set top box 106. A typical television 107 is connected via a video cable to the set top box 106. An extension 5 transmit antenna 110 is also connected to the extension unit 105 to provide an RF communication channel 111 from the extension unit 105 to the base unit 102 via the base unit receive antenna 109. In the preferred embodiment of the invention, the RF communication channel 111 from the extension unit 105 to the base unit 102 transmits data on the 902-905 MHz carrier, thereby avoiding cross-talk between the 10 extension unit's 105 transmitting channel 111 and the base unit's 102 transmitting channel 108.

Figure 2 shows the detailed block diagram of the base unit 102. The preferred embodiment of the base unit 102 receives signals from the central office 101 via a central office line interface circuit 202. The received signals are then mixed 203 with signals from a base control module 201. The mixed signals are frequency modulated by a modulator 204 on to a carrier frequency, preferably of 925-928 MHz. The frequency modulated signal is then passed through an amplifier. The amplified signal is next passed through a filter 206, after which it is transmitted, via the base transmitter 207. The signal is then transmitted to the extension unit 105 through via 15 the base transmitting antenna 103.

Figure 3 shows the detailed block diagram of the extension unit 105. The extension unit 105 receives the signals from the base unit 102 via the extension receiving antenna 104. An extension receiver 301 receives the signal and outputs it 20

to the extension demodulator 302, which demodulates the carrier and sends the data to the set top box 106, via an external line interface circuit 303. The extension unit 105 also has a controller 304, which controls the operation of the extension unit 105. The extension unit 105 also receives data from the set top box 106, usually billing or 5 selection information, via the subscriber line interface circuit 303. This received data is frequency modulated, by an FM modulator 306, which, in the preferred embodiment of the invention, transmits the data at 902-905 MHz. An extension amplifier 307 receives the signal from the extension modulator 306 outputs an amplified signal to the extension filter 308. The extension filter 308 is connected to 10 an extension transmitter 309 for transmitting the filtered signal to the base unit 102 via an extension unit transmitting antenna 110.

While the preferred embodiment of this invention provides a base transmission channel 108 on a carrier frequency of 925-928 MHz, and an extension transmission channel 111 on a carrier frequency of 902-905 MHz, this concept of this invention is 15 not limited thereto.

The described embodiment of this invention is to be considered in all respects only as illustrative and not as restrictive. For example, although the embodiment shown here specifies a particular carrier frequency range and has the extension unit installed within the set top box, the invention is not limited thereto. The scope of this 20 invention is indicated by the appended claims rather than be the foregoing description. All changes, which come within the meaning and range of equivalency of the claims, are to be embraced within their scope.

Claims

We claim:

1. A wireless data jack communication system, comprising:

- (A) a base unit;
- 5 (B) an extension unit;
- (C) a set top box in electrical communication with said extension unit; and
- (D) a first communication channel between said base unit and said extension unit.

2. A wireless data jack communication system, as recited in claim 1, further comprising a second communication channel between said extension unit and said base unit.

3. A wireless data jack communication system, as recited in claim 1, wherein said base unit further comprises:

- (1) a line interface for connecting to a central office;
- 15 (2) a frequency modulator electrically connected to said line interface;
- (3) an amplifier electrically connected to said frequency modulator;
- (4) a filter electrically connected to said amplifier;
- 20 (5) a transmitter electrically connected to said filter; and
- (6) an antenna electrically connected to said transmitter for communicating with said extension unit.

4. A wireless data jack communication system, as recited in claim 1, wherein said base unit further comprises:

- (7) a receiver for receiving signals from said extension unit; and
- (8) a demodulator electrically connected to said receiver.

5 5. A wireless data jack communication system, as recited in claim 1, wherein said extension unit further comprises:

- (1) a line interface for connecting to a set top box;
- (2) a frequency modulator electrically connected to said line interface;
- (3) an amplifier electrically connected to said frequency modulator;
- (4) a filter electrically connected to said amplifier;
- (5) a transmitter electrically connected to said filter; and
- (6) an antenna electrically connected to said transmitter for communicating with said base unit.

6. A wireless data jack communication system, as recited in claim 1, wherein said extension unit further comprises:

- (7) a receiver for receiving signals from said base unit; and
- (8) a demodulator electrically connected to said receiver.

20 7. A wireless data jack communication system, as recited in claim 1, wherein said first communication channel is a first RF transmission channel.

8. A wireless data jack communication system, as recited in claim 7, wherein said first RF transmission channel further comprises a signal frequency modulated on a carrier frequency between 925 MHz and 928 MHz.
9. A wireless data jack communication system as recited in claim 2, wherein said 5 second communication channel is a second RF transmission channel.
10. A wireless data jack communication system, as recited in claim 9, wherein said second RF transmission channel further comprises a signal frequency modulated on a carrier frequency between 902 MHz and 905 MHz.

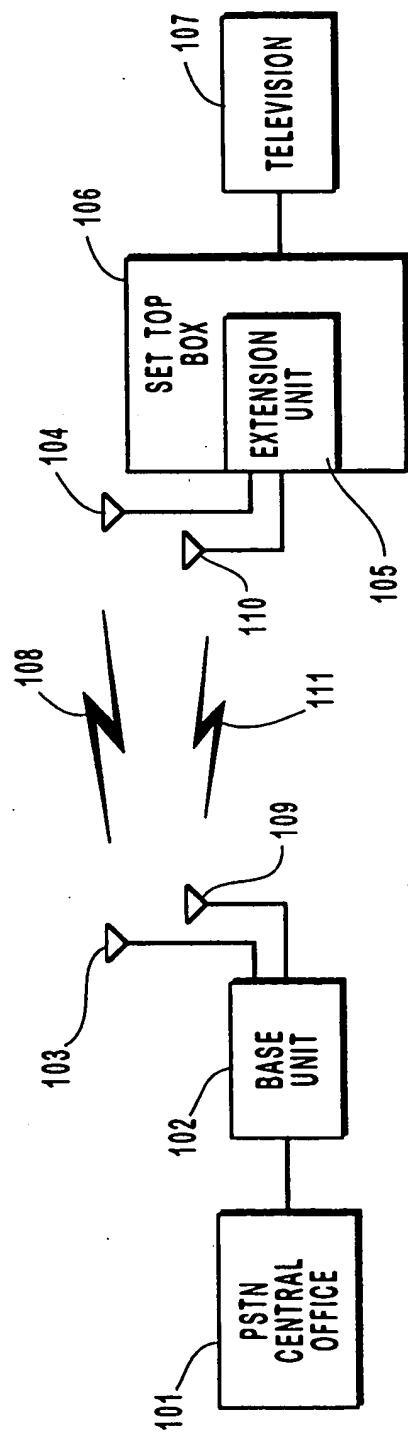


FIG. 1

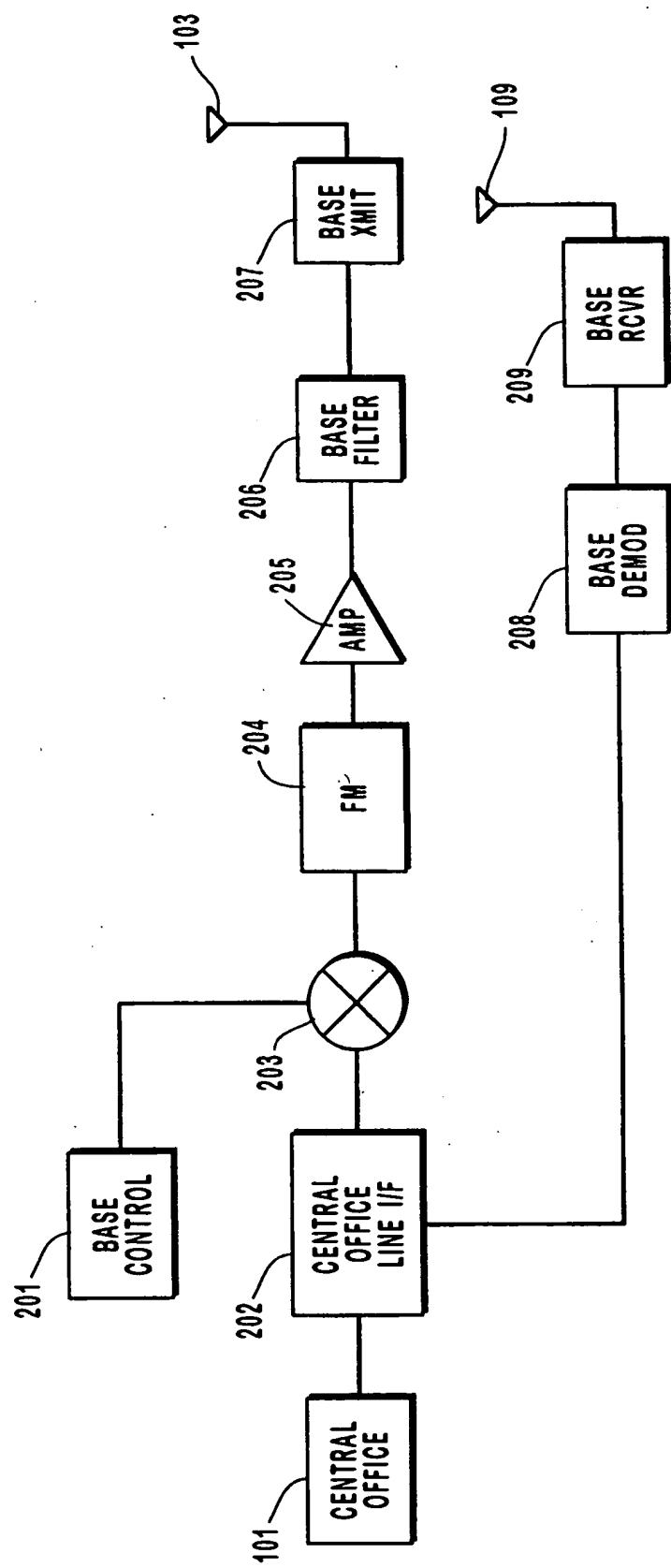


FIG. 2

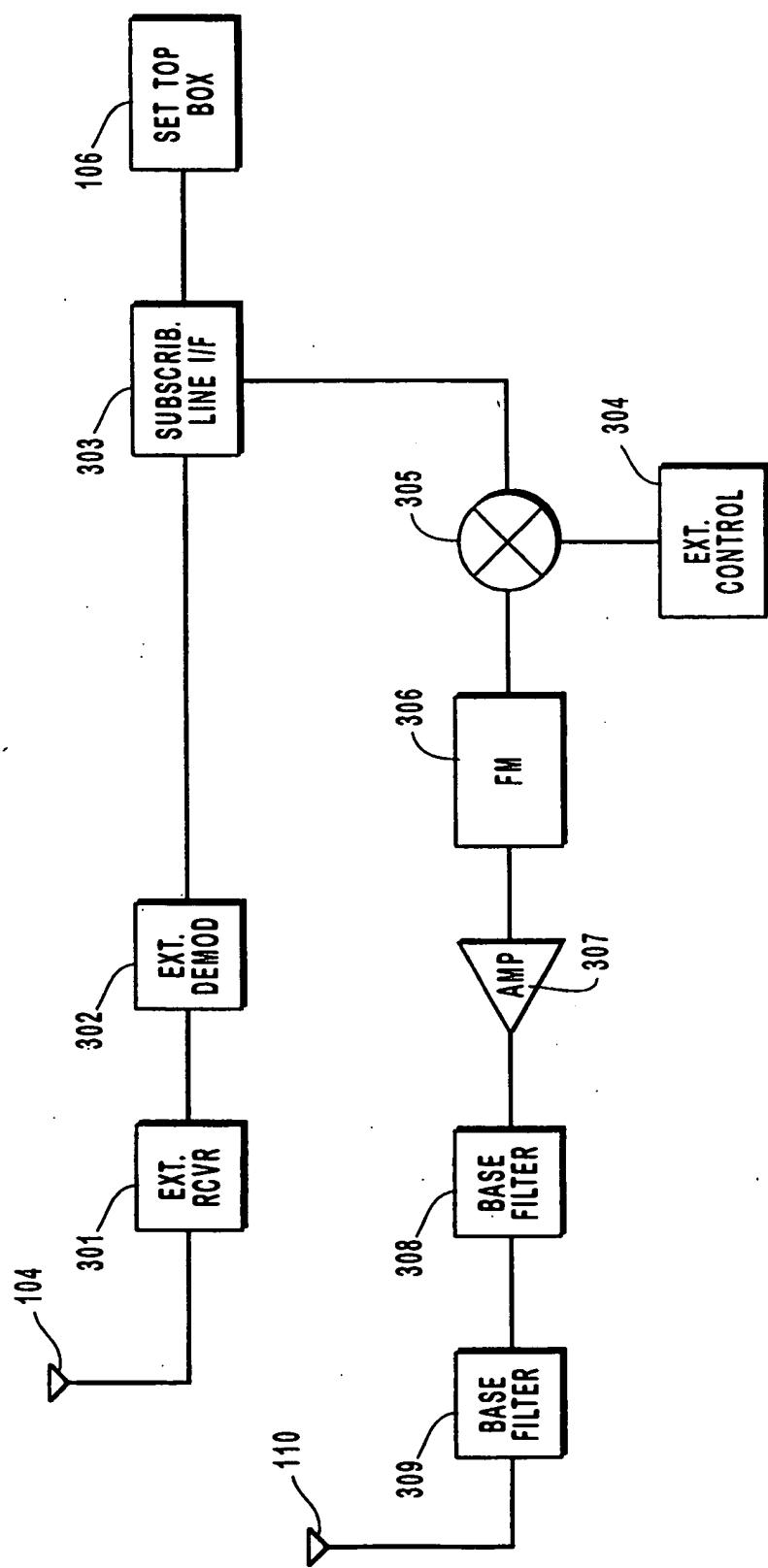


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/28388

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :H04N 7/00, 3/42; H04N 7/173; B01D 11/02
US CL :Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/142,212,220; 725/106, 110, 119, 120, 123, 131;
370/277; 455/557.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST AND DIALOG

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,715,305 A (PENZIAS et al.) 03 February 1998, Fig.2, and col.4, lines 4-6 and 59-66	1-2, 5, and 9 ----- 3-7
Y		
Y, P	US 6,058,104 A (SNELLING et al.) 02 May 2000, Fig.3A, Fig.10, col.3, lines 6 - col.4, lines 2	3-7

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but used to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"T"	
"E" earlier document published on or after the international filing date	"X"	document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"X"	document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"X"	
"P" document published prior to the international filing date but later than the priority date claimed	"X"	document member of the same patent family

Date of the actual completion of the international search

05 DECEMBER 2000

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/28388

A. CLASSIFICATION OF SUBJECT MATTER:
US CL :

379/142, 212, 220; 725/106, 110, 119, 120, 123, 131;
370/277; 455/557.

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